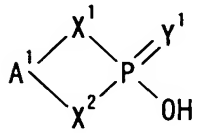
What is claimed is:

1. A process for producing an amine, which comprises reacting an imine compound and a nucleophilic compound (provided that a trialkylsilyl vinyl ether is excluded) in the presence of a phosphoric acid derivative represented by the formula (1):

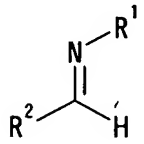


(1)

(wherein A^1 represents a spacer; X^1 and X^2 each independently represent a divalent nonmetal atom or a divalent nonmetal atomic group; and Y^1 represents an oxygen atom or a sulfur atom).

2. The process according to claim 1, wherein the phosphoric acid derivative represented by the formula (1) is an optically active phosphoric acid derivative, and the obtained amine is an optically active amine.

3. The process according to claim 1, wherein the imine compound is an imine compound represented by the formula (2):

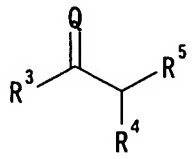


(2)

(wherein R^1 represents a hydrogen atom or a protective group, and R^2 represents a group having no α-proton or an unsaturated hydrocarbon group).

4. The process according to claim 1, wherein the nucleophilic compound is a compound represented by the formula

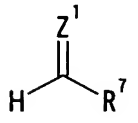
(3):



(3)

(wherein R^3 represents a hydrogen atom, a hydrocarbon group optionally having substituent(s), a heterocyclic group optionally having substituent(s), an alkoxy group optionally having substituent(s), an aryloxy group optionally having substituent(s), an aralkyloxy group optionally having substituent(s) or a substituted amino group; R^4 and R^5 each independently represent a hydrogen atom, a hydrocarbon group optionally having substituent(s), a heterocyclic group optionally having substituent(s), EWG^1 (EWG^1 represents an electron-withdrawing group), an alkoxy group optionally having substituent(s), an aryloxy group optionally having substituent(s), an aralkyloxy group optionally having substituent(s), an alkylthio group optionally having substituent(s), an arylthio group optionally having substituent(s), an aralkylthio group optionally having substituent(s) or a hydroxy group; and Q represents a group giving a tautomer of a compound represented by the formula (3); and R^3 and R^4, R^3 and R^5, or R^4 and R^5 may be taken together to form a ring);

a compound represented by the formula (5):



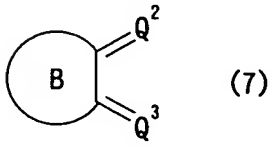
(5)

(wherein R^7 represents a hydrogen atom, a hydrocarbon group optionally having substituent(s), a heterocyclic group

optionally having substituent(s), an alkoxy group optionally having substituent(s), an aryloxy group optionally having substituent(s) or an aralkyloxy group optionally having substituent(s), an alkylthio group optionally having substituent(s), an arylthio group optionally having substituent(s), an aralkylthio group optionally having substituent(s) or EWG^2 (EWG^2 represents an electron-withdrawing group); and Z^1 represents N_2, $P(R^8)_3$ (three of R^8 the same or different represent a hydrogen atom, a hydrocarbon group optionally having substituent(s), a heterocyclic group optionally having substituent(s), an alkoxy group optionally having substituent(s), an aryloxy group optionally having substituent(s) or an aralkyloxy group optionally having substituent(s)), or CR^9R^{10} (R^9 and R^{10} each independently represent a hydrogen atom, a hydrocarbon group optionally having substituent(s), a heterocyclic group optionally having substituent(s), an alkoxy group optionally having substituent(s), an aryloxy group optionally having substituent(s), an aralkyloxy group optionally having substituent(s), an alkylthio group optionally having substituent(s), an arylthio group optionally having substituent(s), an aralkylthio group optionally having substituent(s), an amino group or a substituted amino group; provided that either one of R^9 and R^{10} represents an alkoxy group optionally having substituent(s), an aryloxy group optionally having substituent(s), an aralkyloxy group optionally having substituent(s), an alkylthio group optionally having substituent(s), an arylthio group optionally having substituent(s), an aralkylthio group optionally having

substituent(s), an amino group or a substituted amino group));

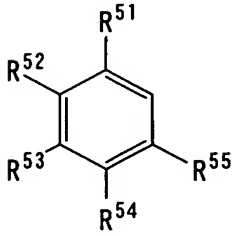
a compound represented by the formula (7):



(7)

(wherein ring B represents an aliphatic ring or an aliphatic heterocycle; and Q^2 and Q^3 each independently represent an oxygen atom, NR^{17} (R^{17} represents a hydrogen atom or a protective group) or a sulfur atom); or

a benzene represented by the formula (21):

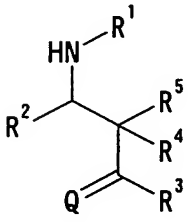


(21)

(wherein R^{51} to R^{55} each independently represent a hydrogen atom or a substituent; provided that R^{51} and R^{52}, R^{52} and R^{53}, R^{53} and R^{54}, or R^{54} and R^{55} may be taken together to form a ring).

5. The process according to claim 1, wherein the obtained amine is

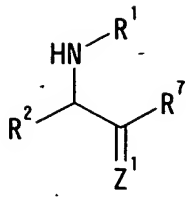
an amine represented by formula (4):



(4)

(wherein R^1 to R^5 and Q are the same as defined above);

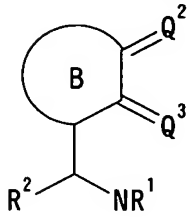
an amine represented by the formula (6):



(6)

(wherein R^1, R^2, R^7 and Z^1 are the same as defined above);

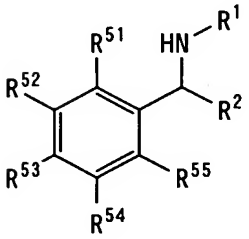
an amine represented by the formula (8):



(8)

(wherein R^1, R^2, Q^2 and Q^3 are the same as defined above); or

a compound represented by the formula (22):



(22)

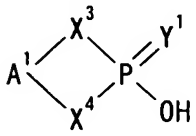
(wherein R^1, R^2 and R^{51} to R^{55} are the same as defined above).

6. The process according to claim 5, wherein the amine represented by the formula (4), (6), or (8) is an optically active amine.

7. The process according to claim 1, wherein the divalent nonmetal atom or the divalent nonmetal atomic group represented by X^1 and X^2 in the formula (1) is an oxygen atom, $-NR^{13}-$ (R^{13} represents a hydrogen atom, a hydrocarbon group optionally having substituent(s) or an acyl group optionally having substituent(s)), a sulfur atom or $-CR^{15}R^{16}-$ {R^{15} and R^{16} each

independently represent a hydrogen atom, a hydrocarbon group optionally having substituent(s) or EWG^3 (EWG^3 represents an electron-withdrawing group); provided that either one of R^{15} and R^{16} is EWG^3}.

8. A phosphoric acid derivative represented by the formula (1a):

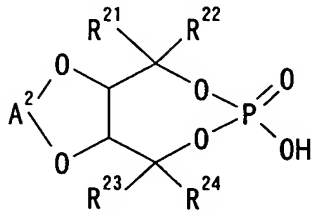


(1a)

(wherein A^1 represents a spacer; X^3 and X^4 each independently represent an oxygen atom, $-NR^{13}-$ (R^{13} represents a hydrogen atom, a hydrocarbon group optionally having substituent(s) or an acyl group optionally having substituent(s)), a sulfur atom or $-CR^{15}R^{16}$ {R^{15} and R^{16} each independently represent a hydrogen atom, a hydrocarbon group optionally having substituent(s) or EWG^3 (EWG^3 represents an electron-withdrawing group); provided that either one of R^{15} and R^{16} is EWG^3}; and Y^1 represents an oxygen atom or a sulfur atom, provided that when i) $X^3=X^4$, then X^3 and X^4 are each $-NR^{13}-$ (R^{13} is a hydrogen atom, a hydrocarbon group optionally having a substiuent or an acyl group optionally having substituent(s)), a sulfur atom or $-CR^{15}R^{16}-$, or when X^3 and X^4 are each $-NR^{13}-$, then the $-NR^{13}-$ is $-NR^a-$ (R^a represents an acyl group derived from sulfonic acid), or when ii) X^3 and X^4 are different from each other, then either one of X^3 and X^4 is $-NR^{13}-$, and the $-NR^{13}-$ is $-NR^a-$ (R^a represents an acyl group derived from sulfonic acid) and the other is an oxygen atom, $-NR^{13}-$ (R^{13} represents a hydrogen atom, a hydrocarbon group optionally having substituent(s) or an acyl group optionally having substituent(s)), a sulfur atom or $-CR^{15}R^{16}-$).

9. The phosphoric acid derivative according to claim 8, wherein the phosphoric acid derivative represented by the formula (1a) is an optically active phosphoric acid derivative.

10. A phosphoric acid derivative represented by the formula (1b):

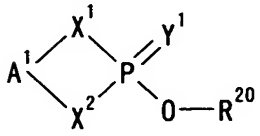


(1b)

(wherein A^2 represents a spacer; and R^{21} to R^{24} each independently represent a hydrocarbon group optionally having substituent(s) or a heterocyclic group optionally having substituent(s)).

11. The phosphoric acid derivative according to claim 10 wherein the phosphoric acid derivative represented by the formula (1b) is an optically active phosphoric acid derivative.

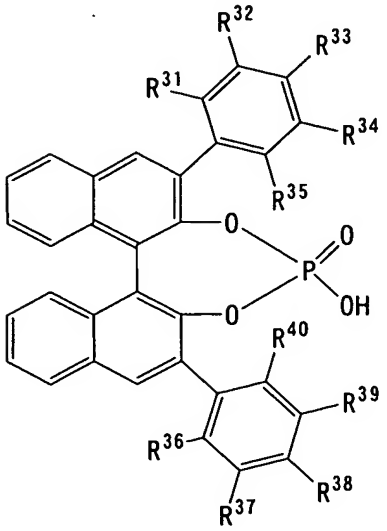
12. A phosphoric acid derivative represented by the formula (9):



(9)

(wherein A^1 represents a spacer; X^1 and X^2 each independently represent a divalent nonmetal atom or a divalent nonmetal atomic group; Y^1 represents an oxygen atom or a sulfur atom; and R^{20} represents an allyl group optionally having substituent(s) or a benzyl group optionally having substituent(s)).

13. A phosphoric acid derivative represented by the formula (11):

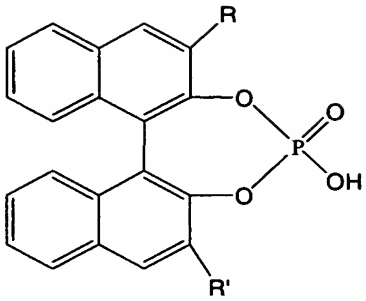


(11)

(wherein R^{31} to R^{40} each independently represent a substituent other than an alkyl-substituted phenyl group; provided that at least one of R^{31} to R^{35} and at least one of R^{36} to R^{40} are an aryl group optionally having substituent(s) (provided that an alkyl-substituted phenyl group is excluded)).

14. The phosphoric acid derivative according to claim 11, wherein the phosphoric acid derivative represented by the formula (11) is an optically active phosphoric acid derivative.

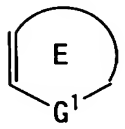
15. The process according to claim 1, wherein the phosphoric acid derivative represented by the formula (1) is a phosphoric acid derivative represented by the formula (11'):



(11')

(wherein R and R' the same or different represent a hydrogen atom, a bromine atom, an iodine atom, a methoxy group, a triphenylsilyl group, a naphthyl group, a phenyl group or a phenyl group having 1 to 3 substituent(s) (wherein the substituent is a substituent selected from a fluorine atom, a methoxy group, a methyl group, a tert-butyl group, a phenyl group, a trifluoromethyl group, and a naphthyl group)).

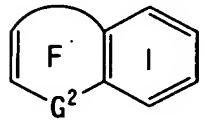
16. The process according to claim 1, wherein the nucleophilic compound is an unsaturated heterocyclic compound represented by the formula (14):



(14)

(wherein G^1 represents S or NR^{26} (R^{26} represents a hydrogen atom or a protective group); and ring E represents a monocyclic heterocycle having at least one double bond); or

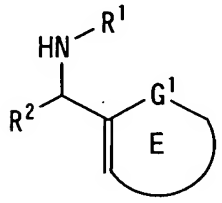
an unsaturated heterocyclic compound represented by the formula (16):



(16)

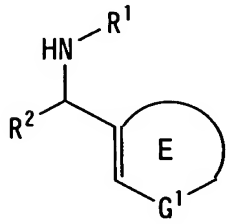
(wherein G^2 represents a heteroatom or a heteroatom; ring F

represents a heterocycle having at least one double bond; and ring I represents an aromatic ring optionally having substituent(s) or a heterocycle optionally having substituent(s)); and the obtained amine is an amine represented by the formula (15-1):



(15-1)

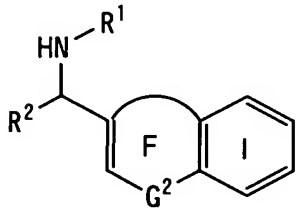
and/or the formula (15-2):



(15-2)

(wherein R^1 represents a hydrogen atom or a protective group; R^2 represents a group having no α-proton or an unsaturated hydrocarbon group; and ring E and G^1 are the same as defined above); or

an amine represented by the formula (17):

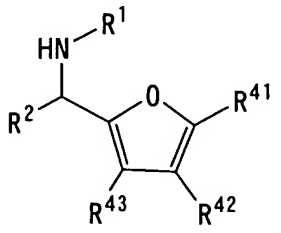


(17)

(wherein R^1 represents a hydrogen atom or a protective group; R^2 represents a group having no α-proton or an unsaturated hydrocarbon group; and G^2, ring F and ring I are the same as defined above).

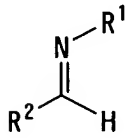
17. The process according to claim 16, wherein the obtained amine is an optically active amine.

18. A process for producing an amine represented by the formula (13):



(13)

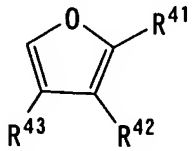
(wherein R^1 represents a hydrogen atom or a protective group; R^2 represents a group having no α-proton or an unsaturated hydrocarbon group; and R^{41} to R^{43} each independently represent a hydrogen atom or a substituent), which comprises reacting an imine compound represented by the formula (2):



(2)

(wherein R^1 represents a hydrogen atom or a protective group, and R^2 represents a group having no α-proton or an unsaturated hydrocarbon group)

with a furan represented by the formula (12):



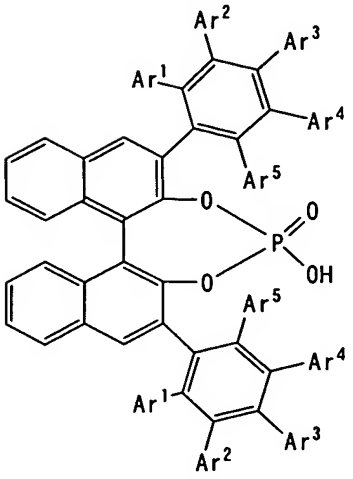
(12)

(wherein R^{41} to R^{43} each independently represent a hydrogen atom or a substituent).

19. The process according to claim 18, wherein the

obtained amine is an optically active amine.

20. A phosphoric acid derivative represented by:



(31)

(wherein Ar^1 to Ar^5 each independently represent a hydrogen atom or an alkyl-substituted phenyl group; provided that the case where all of Ar^1 to Ar^5 are a hydrogen atom is excluded).

21. The phosphoric acid derivative according to claim 20, wherein the phosphoric acid derivative represented by the formula (31) is an optically active phosphoric acid derivative.

22. A catalyst for asymmetric synthesis, which comprises the optically active phosphoric acid derivative as defined in claim 9.